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(57) A method of making mailing containers (27) comprises centrally folding a web (10) of lining material, applying webs (12, 13) of outer sheet material to the outside faces of the folded lining material web so that the latter is completely covered, securing together the edge regions of the outer material webs where they project beyond the fold in the lining material web, securing an edge region of each outer material web to an associated part of the lining material web at the side opposite the fold in the lining

material web, and securing all the webs along two spaced lines transversely of the webs, all the webs otherwise being unattached over the remainder of their surfaces. The resulting mailing container is closed at one end and along two sides, it comprises a centrally-folded lining sheet located between rectangular outer sheets, the four layers being un laminated except where all the layers are secured together at two opposed edge regions, the two outer sheets which extend beyond the fold in the lining sheet, are secured to one another at the closed end of the container and, at the open end, each outer sheet is secured along the edge to the associated part of the lining sheet. Lining-free parts of the outer sheets are provided for forming a closure at the open end of the container.



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- 1 / 3 -

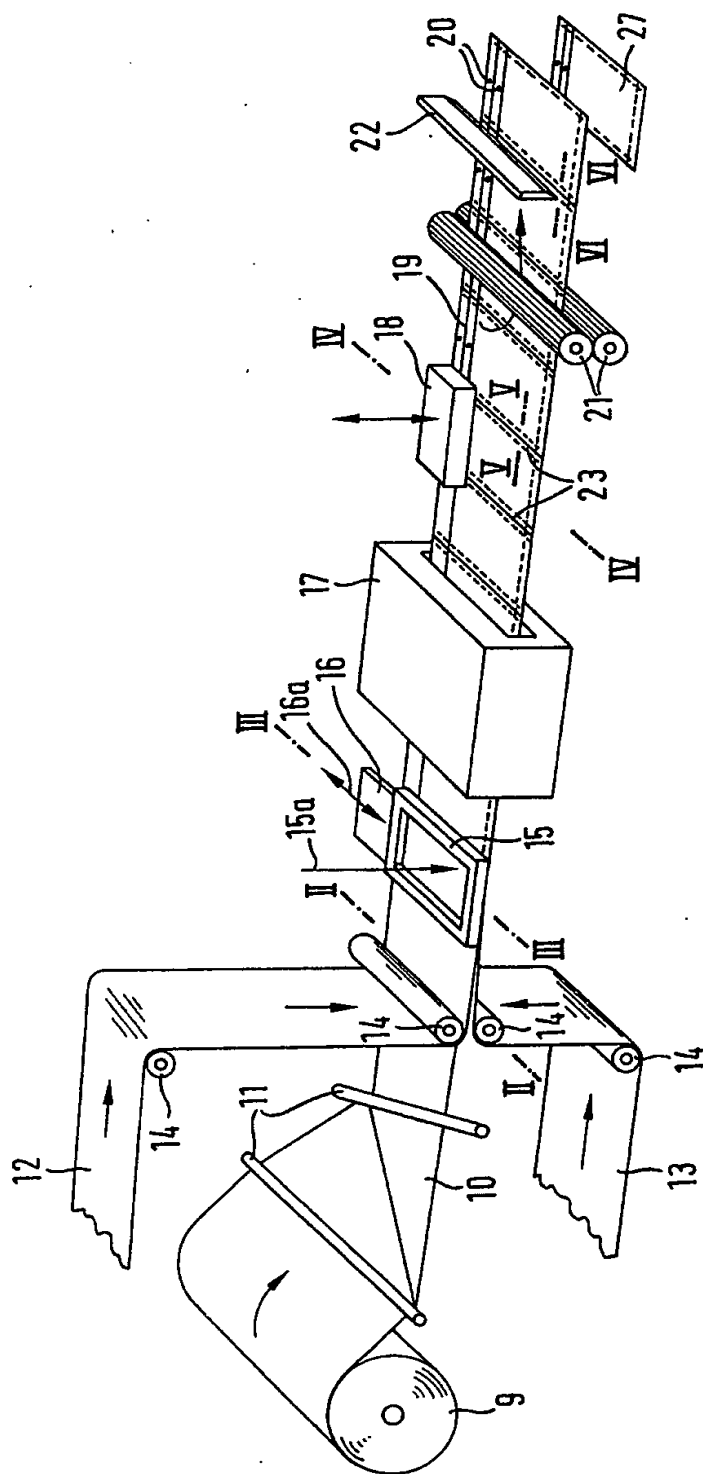


FIG. 1

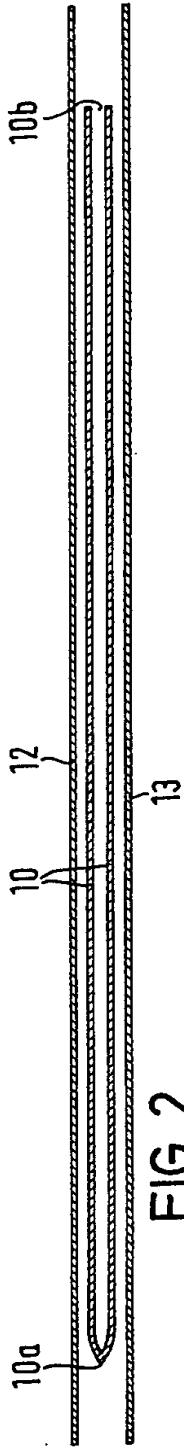


FIG. 2

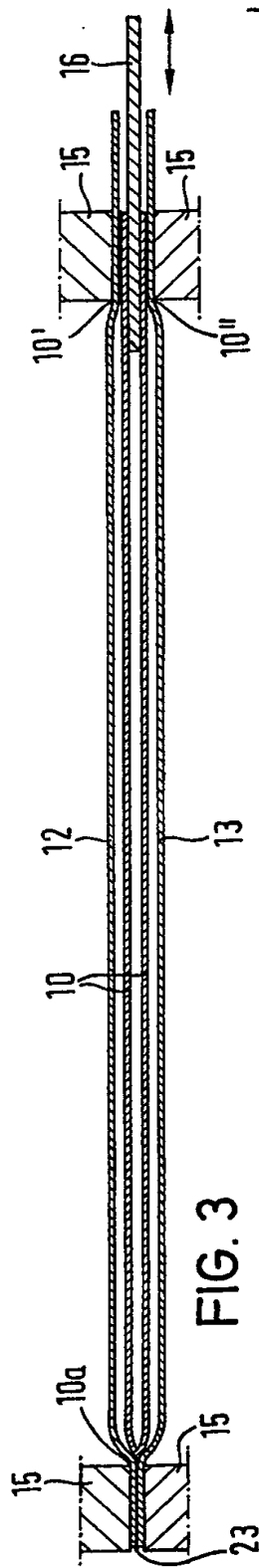


FIG. 3

- 2 / 3 -

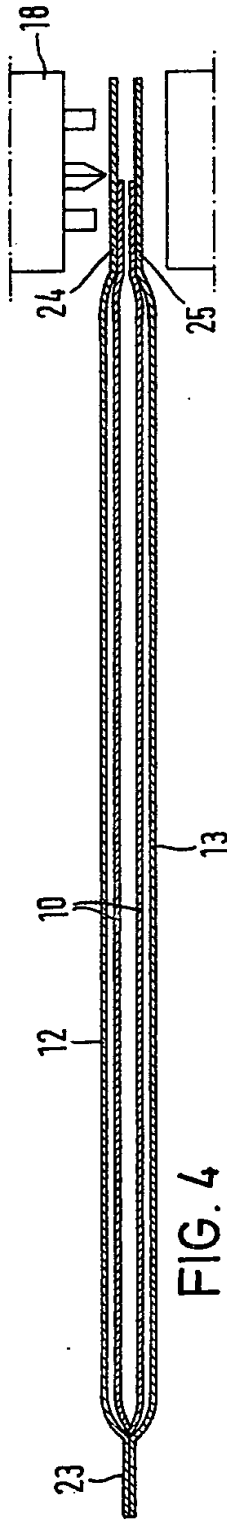


FIG. 4

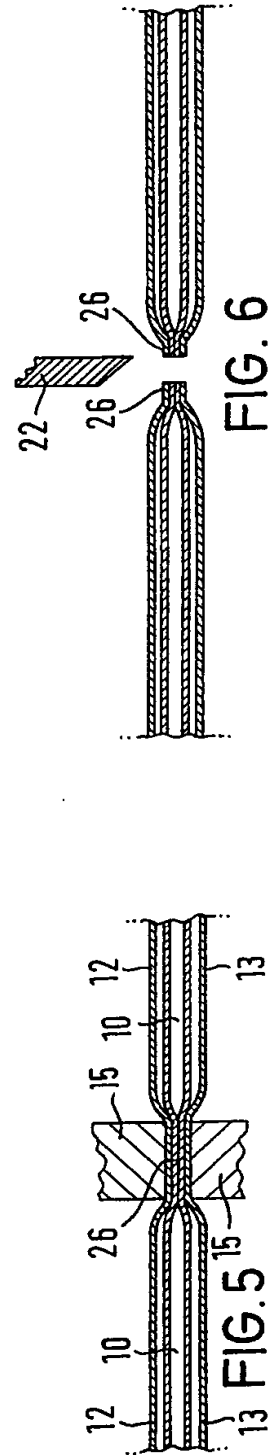


FIG. 5

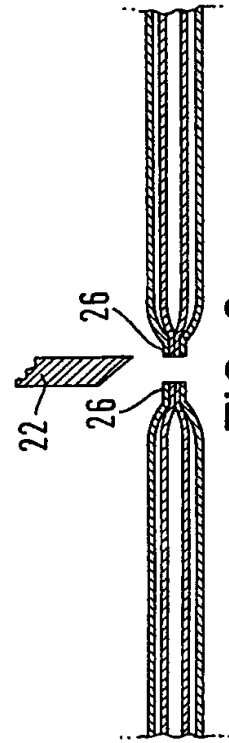
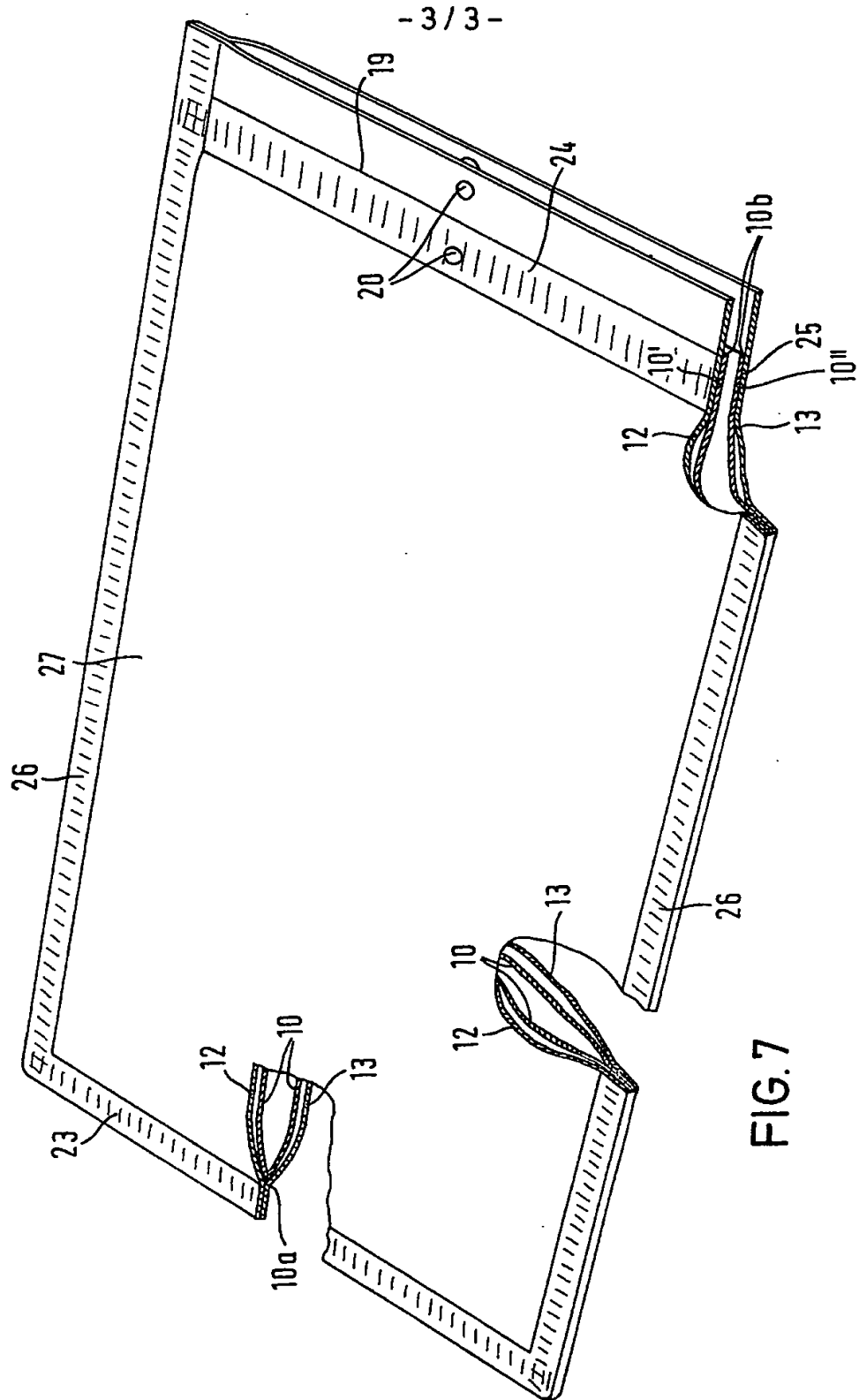


FIG. 6



## SPECIFICATION

## A method of manufacture of mailing containers

The present invention relates to a method for the manufacture of mailing envelopes, sample containers or similar mailing containers and is particularly concerned with an improved method of manufacturing such a container, having multiple-layer edge regions, which is especially suited to use as a mailing container, since it can be readily assembled at low cost, is light in weight and affords excellent protection of its contents against damage from moisture and shock.

Mailing containers of this type are needed when angular and/or delicate, fragile or otherwise pressure-sensitive articles have to be despatched. Many forms of construction of protective mailing containers have been proposed and made.

A particular form of construction of a mailing container is disclosed in GB-PS 1374257, comprising a rectangular pneumatic shock-absorbent and heat-insulating liner blanket which is provided with a plurality of hermetically-sealed cells, and a rectangular outer covering layer. In the manufacture of such a mailing container, the outer covering layer is laminated with the liner blanket, that is to say, they are attached over substantially the whole of their adjoining surfaces, one edge only of the envelope being formed by a fold of the liner blanket and outer covering layer, after lamination, and two further edges of the envelope being seamed, the liner blanket being within the envelope.

The disadvantages of such known methods of manufacture include the fact that they can be difficult or complicated to carry out, especially if the sheet of liner material has to project along one side beyond the corresponding side of the outer wrapper.

A disadvantage of the known form of envelope or mailing container, in which the outer wrapper layer and the inner lining layer or blanket are laminated with one another, is that the outer wrapper layer and the inner lining layer are not movable relative to one another. If articles with sharp edges or corners are despatched in such envelopes, there is the risk that the container will tear, since the relatively good flexibility of the inner lining layer cannot operate satisfactorily with the relatively less flexible outer wrapper layer with which it is laminated.

The invention is therefore based upon the purpose of providing a relatively simple method of manufacture of such a mailing container, mailing envelope or sample envelope, so that a product having the advantages of very low inherent weight and satisfactory cushioning and protective properties, which are not adversely affected during despatch even of sharp-edged articles or by careless handling, can be made inexpensively.

According to one aspect of this invention, a method of manufacture of a mailing container is provided, which comprises:

- (a) centrally folding a web of lining material,
- (b) applying a web of outer material to each of

the two outer surfaces of the folded lining material web, each outer material web being wider than and thus covering the folded lining web,

(c) securing together the edge regions of the outer material webs where they project beyond the fold in the lining material web, securing the edge region of each outer material web to the associated part of the lining material, at the side opposite the fold in the lining material, and securing together all the webs of material at two transverse regions of the webs, all the webs of material being unattached over the remainder of their surfaces, and

(d) providing fold lines and/or eyelets for closure elements, in the lining-free part of the or each outer material web adjacent its connection with the associated lining material at the side opposite the fold in the lining material.

Preferably, the method is operated continuously, the webs of lining material and outer material are advanced simultaneously and, after being subjected to the successive steps (a) to (d), individual mailing containers are severed from the web assembly.

A mailing envelope or similar container according to the invention, is closed at two opposite sides and at one end and has at the other end a closable opening for the insertion and removal of material to be packaged and/or despatched in the container, wherein the mailing container comprises two rectangular outer sheets and a one-piece centrally-folded rectangular inner lining sheet, the width of which is the same as the width of the outer sheets and the unfolded length of which is less than double the length of each outer sheet, each part of the lining sheet being co-extensive with one of the outer sheets, the outer sheets and the two parts of the lining sheet being permanently secured together along their associated edge regions to form the two opposite closed sides of the mailing container, the two outer sheets also being permanently secured to one another adjacent the fold in the lining sheet at the closed end of the mailing container and, at the other end of the mailing container, each outer sheet being permanently secured adjacent its edge to the edge of the associated part of the lining sheet, all the sheets being unattached over the remainder of their surfaces and parts of the or each outer sheet at the open end of the mailing container being free from inner lining material and comprising a closure for the mailing container.

The two outer sheets each typically consist of a rectangular sheet of material having a length a few centimetres greater than the length of the folded inner lining. More specifically, the container of the invention incorporates an outer wrapper, in practice made from two sheets of a material which allows labels, stamps and inks readily to adhere to it, such as, by way of non-limitative example, specially-treated kraft paper. The container also utilizes an inner lining which forms the inner wall of the container and preferably comprises a centrally-folded plastics film which is flexible and light in weight. In this connection, it

has been found that polyethylene gives excellent results, although other polyolefin films, such as polypropylene, and other films, such as polystyrene and polyvinyl chlorides, may be used.

5 The two outer sheets are permanently secured together along their edges adjacent the fold in the inner lining, while along the two mutually opposite longitudinal or side edges the two outer sheets are permanently secured both to one another and to  
10 the folded inner lining located therebetween. The two outer sheets may be united at their edges adjacent the fold in the liner by means of a resin adhesive or by other means well-known to those skilled in the art. By using kraft paper sheets as the  
15 outer sheets, the paper may be coated with a heat-sealable material, such as polyethylene, and the two outer sheets may be united by the use of heat, such as by heat-sealing or welding.

The assembly of the two outer sheets and the  
20 folded inner lining material may be heat-sealed along its two side edges, in order to secure together any and all of the layers to form multiple layer weld seams. The inner lining material may comprise a liner blanket or sheet provided with a plurality of sealed cells. Such air-cushion heat-  
25 sealable material may comprise two plastics films having protuberances formed in one film, the second film being used to seal these protuberances so as to form closed air-pockets (as known to the skilled person, for instance from US-  
30 PS 3 349 990).

The open end of the mailing container serves as a one-piece opening for the material being despatched. At the openable end of the mailing  
35 container, each part of the folded inner lining is fixedly secured at the edge to the corresponding outer sheet. Such an arrangement provides an insertion opening, in which the inner lining is permanently secured to the outer sheet, so that on  
40 insertion of the contents to be packaged, none of the contents can pass into the space between the lining material and the outer or wrapping material. By this method of construction, the lining material is fixedly secured within the wrapping material,  
45 even though at the lower end of the mailing container only the two outer sheets are fixedly connected together and the fold of the lining material is not secured between them.

If an air-cushion heat-sealable material is used  
50 as the lining material, on welding with the outer material in the region of the opening, the sealed protuberances become crushed or collapsed and the air-cushion material is compressed to minimal thickness. This has the advantage that insertion  
55 and removal of the contents to be despatched in the mailing container is facilitated.

At the end of the mailing container moreover, in known manner, a foldable flap closure of any known kind can be provided, wherein as usual fold  
60 lines and closure means can be provided, for example an adhesive layer, an adhesive carrier or apertures and eyelets for use with closure clips or the like.

The present invention is described in more  
65 detail below by way of illustration in conjunction

with the accompanying drawings, wherein:

Fig. 1 shows diagrammatically an apparatus for continuously carrying out a preferred form of the method according to the invention;

70 Fig. 2 shows a cross-section at II—II in Fig. 1;  
Fig. 3 shows a cross-section at III—III in Fig. 1;  
Fig. 4 shows a cross-section at IV—IV in Fig. 1;  
Fig. 5 shows a cross-section at V—V in Fig. 1;  
Fig. 6 shows a cross-section at VI—VI in Fig. 1;  
75 and

Fig. 7 shows a perspective view of a preferred embodiment of the mailing container manufactured according to the method illustrated in Fig. 1.

80 The apparatus illustrated in Fig. 1 serves for continuously manufacturing mailing containers 27 in accordance with the invention. From a supply roll 9, a lining material web is advanced in the direction of the arrow and is centrally folded by means of a folding device 11, so that a so-called half-sleeve web 10 is produced. The folding device 11 can advantageously be the type of apparatus described in GB-PS 1418347. Respective outer or wrapper material webs 12 and 13 are guided in  
85 the direction of the arrows shown by rollers 14, from above and below, parallel to the half-sleeve web 10 and the latter then advances together with these outer webs 12 and 13.

As shown in Fig. 2, the two outer webs 12 and 13 are somewhat wider than the half-sleeve web 10, so that they extend further, e.g. by a few centimetres both at the fold 10a in the half-sleeve web 10 and also at the opposite edge 10b of the web 10.

100 In the following method steps, the web assembly 10, 12, 13 is advanced to a device for carrying out welding (heat sealing), which is schematically illustrated as a welding bar frame 15, which moves perpendicular to the plane of travel of the web assembly, as illustrated by the arrow 15a. This welding frame 15 co-operates with a slide plate 16 which is movable inwardly and outwardly in the direction of the arrow 16a in synchronism with the welding frame 15, which prevents the two parts 10' and 10'' of the lining material being connected together, at the open insertion end of the eventual mailing container. The welding frame 15 can desirably be a heat-sealing apparatus of the kind described for example in GB-PS 1328484. The width of the sealing element of the apparatus 15, which operates transversely of the direction of advance of the web assembly, is adjusted so as to correspond to the width of the mailing containers to be manufactured.  
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After formation of the heat-seals or welds, as illustrated in Fig. 3, at the edge adjacent the fold 10a, a weld seam 23 is made by means of the welding frame 15 between the two outer webs 12 and 13. As the outer or wrapper material of the webs 12 and 13, polyethylene-coated kraft paper is preferably used. At the opposite open end, the webs 12 and 13 are welded to the respective parts 10' and 10'' of the lining material. The weld seams so produced are indicated in Fig. 4 at 24  
125  
130

and 25. It can be seen from Fig. 5 that, by means of the welding frame 15 guided transversely of the direction of advance of the web assembly (10, 12, 13), any and all the webs of material are welded together at spaced regions extending transversely of the travelling webs, so as to form multiple-layer weld seams 26 forming the long sides of the prepared mailing containers, which weld seams 26 consist of both parts of the lining material or half-sleeve web 10 and the two outer webs 12 and 13 of the wrapper material. Apart from the edge regions where the various webs are heat-sealed or otherwise secured together in the various ways just described, the various sheets or webs are left un laminated and thus are unattached over the remainder of their surfaces.

The web assembly provided in the heat seal device, i.e. the welding frame 15, with the weld seams 23, 26 at the bottom and the sides of the eventual container 27 and the weld seams 24 and 25 at its closable opening is then advanced to a cooling device 17, in which the parts treated in the heat-seal apparatus are cooled. Finally, the cooled web assembly advances to a folding (or scoring) and punching device 18, by means of which fold lines 19 and apertures or eyelets 20 are formed in either or both of the sheets 12, 13 at the open end part, which apertures or eyelets 20 serves for the reception of closure elements, such as clips (or fasteners), and thus serve for closing the later-prepared individual mailing containers 27.

In the apparatus illustrated in Fig. 1, a web assembly advancing device is shown, in the form of a pair of feed rollers 21 which are arranged adjacent the scoring and punching device 18. This advancing device 21 obviously can be located at any other suitable place within the apparatus.

The thus-prepared web assembly then advances finally to a cutting device 22, which serves to divide each transverse weld seam 26 centrally, as can be seen in Fig. 6. The individual mailing containers 27 thus separated from the web assembly can then be advanced in ways known for this purpose to sorting, examination and packing stations and then forwarded from there for despatch.

In Fig. 7, a prepared mailing container 27 made in this way is shown in a detailed perspective view. It can clearly be seen that the weld seams 26, formed transversely of the web assembly but running longitudinally of the mailing containers 27 *per se*, are of multiple-layer construction, being formed from the two parts or sheets of lining material of the half-sleeve web 10, as well as the two rectangular outer or wrapper material sheets or webs 12 and 13. On the other hand, the heat-seal weld seam 23, adjoining the fold 10a of the one-piece rectangular lining material 10, consists of the two outer webs 12 and 13 fixedly connected together. At the open end, i.e. opposite the fold 10a and the weld seam 23, the weld seams 24 and 25 can be seen, which are formed by heat-sealing the inner lining portion 10' to the outer web 12 and the inner lining portion 10" to the outer web 13 respectively. The apertures or

eyelets 20 can also be seen, which are located in the parts of the two outer webs 12 and 13 which project beyond the extreme edges of the part 10b of the lining, and also in the weld seams 24 and 25, together with the fold lines 19 made between the respective weld seams 24 and 25 and the adjacent lining-free parts of the outer webs 12 and 13.

Mailing containers in accordance with the invention have the advantage that stresses and strains, which can be caused particularly if the packaged or mailed contents are angular or are formed with sharp corners and edges, are taken up and absorbed by the inner lining material, 10, which in comparison with the outer material webs 12 and 13 has a greater flexibility and thus, as it is located freely-movably with respect to the outer wrapping material by virtue of the un laminated construction of the mailing container 27, can adapt better to these edges and corners of the mailed material, without greater forces having to be absorbed by the outer wrapping material. This has the advantageous result that the risk of tearing during packing or insertion of the mailed material or during despatch are considerably minimised.

#### CLAIMS

1. A method of manufacture of a mailing container, which comprises:

- (a) centrally folding a web of lining material,
- (b) applying a web of outer material to each of the two outer surfaces of the folded lining material web, each outer material web being wider than and thus covering the folded lining web,

(c) securing together the edge regions of the outer material webs where they project beyond the fold in the lining material web, securing the edge region of each outer material web to the associated part of the lining material, at the side opposite the fold in the lining material, and securing together all the webs of material at two transverse regions of the webs, all the webs of material being unattached over the remainder of their surfaces, and

(d) providing fold lines and/or eyelets for closure elements, in the lining-free part of the or each outer material web adjacent its connection with the associated lining material at the side opposite the fold in the lining material.

2. A method according to claim 1, which is operated continuously, the webs of lining material and outer material are advanced simultaneously and, after being subjected to the successive steps (a) to (d), individual mailing containers are severed from the web assembly.

3. A method of manufacture of a mailing container, substantially as hereinbefore described with reference to Fig. 1 and Figs. 2 to 6 of the accompanying drawings.

4. A mailing container, which is closed along two opposite sides and at one end and has at the other end a closable opening for the insertion and removal of material to be packaged and/or despatched in the container, wherein the mailing



container comprises two rectangular outer sheets and a one-piece centrally-folded rectangular inner lining sheet, the width of which is the same as the width of the outer sheets and the unfolded length of which is less than double the length of each outer sheet, each part of the lining sheet being co-extensive with one of the outer sheets, the outer sheets and the two parts of the lining sheet being permanently secured together along their associated edge regions to form the two opposite closed sides of the mailing container, the two outer sheets also being permanently secured to one another adjacent the fold in the lining sheet at the closed end of the mailing container and, at the other end of the mailing container, each outer sheet being permanently secured adjacent its edge to the edge of the associated part of the lining sheet, all the sheets being unattached over

the remainder of their surfaces and parts of the or each outer sheet at the open end of the mailing container being free from inner lining material and comprising a closure for the mailing container.

5. A mailing container according to claim 4, wherein the outer sheets comprise kraft paper coated with heat-sealable plastics material and the inner lining sheet comprises an air-cushion heat-sealable material, their associated edge regions at the two opposite closed sides are secured together by heat-sealing, the edges of the outer sheets are secured together by heat-sealing at the closed end and at the open end, the edge of each part of the lining sheet is secured by heat-sealing to its respective outer sheet.

6. A mailing container according to claim 4, substantially as described with reference to Fig. 7 of the accompanying drawings.